【CLAIMS】

【Claim 1】 A bake-hardenable cold rolled steel sheet having excellent formability, comprising: 0.003 ~ 0.005 % of C; 0.003 ~ 0.03 % of S; 0.01 ~ 0.1 % of Al; 0.02 % or less of N; 0.2 % or less of P; at least one of 0.03 ~ 0.2 % of Mn and 0.005 ~ 0.2 % of Cu; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein, when the steel sheet comprises one of Mn and Cu, a composition of Mn, Cu, and S satisfies one of relationships: $0.58*Mn/S \leq 10$ and $1 \leq 0.5*Cu/S \leq 10$, and when the steel sheet comprises both Mn and Cu, a composition of Mn, Cu, and S satisfies the relationships: $Mn+Cu \leq 0.3$ and $2 \leq 0.5*(Mn+Cu)/S \leq 20$, and wherein precipitates of MnS, CuS, and (Mn, Cu)S have an average size of 0.2 ㎛ or less.

【Claim 2】 A bake-hardenable cold rolled steel sheet having excellent formability, comprising: 0.003 ~ 0.005 % of C; 0.005 ~ 0.03 % of S; 0.01 ~ 0.1 % of Al; 0.02 % or less of N; 0.2 % or less of P; 0.05 ~ 0.2 % of Mn; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein a composition of Mn and S satisfies the relationship: $0.58*Mn/S \leq 10$ in terms of weight, and wherein precipitates of MnS have an average size of 0.2 ㎛ or less.

【Claim 3】 The steel sheet as set forth in claim 2, wherein the steel sheet comprises 0.015 % or less of P.

【Claim 4】 The steel sheet as set forth in claim 2, wherein the steel sheet comprises 0.004 % or less of N.

【Claim 5】 The steel sheet as set forth in claim 2, wherein the steel sheet comprises 0.03 ~ 0.2 % of P.

【Claim 6】 The steel sheet as set forth in claim 2, wherein the steel sheet further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

【Claim 7】 The steel sheet as set forth in claim 2, wherein the steel sheet comprises

0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

【Claim 8】 The steel sheet as set forth in claim 7, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52*Al/N \leq 5$.

【Claim 9】 The steel sheet as set forth in any one of claims 2 to 8, wherein the steel sheet further comprises 0.01 ~ 0.2 % of Mo.

【Claim 10】 A bake-hardenable cold rolled steel sheet having excellent formability, comprising: 0.003 ~ 0.005 % of C; 0.003 ~ 0.025 % of S; 0.01 ~ 0.08 % of Al; 0.02 % or less of N; 0.2 % or less of P; 0.01 ~ 0.2 % of Cu; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein a composition of Cu and S satisfies the relationship: $1 \leq 0.5*Cu/S \leq 10$ in terms of weight, and wherein precipitates of CuS have an average size of 0.1 ㎛ or less.

【Claim 11】 The steel sheet as set forth in claim 10, wherein the steel sheet comprises 0.015 % or less of P.

【Claim 12】 The steel sheet as set forth in claim 10, wherein the steel sheet comprises 0.004 % or less of N.

【Claim 13】 The steel sheet as set forth in claim 10, wherein the composition of Cu and S satisfies the relationship: $1 \leq 0.5*Cu/S \leq 3$.

【Claim 14】 The steel sheet as set forth in claim 10, wherein the steel sheet comprises 0.03 ~ 0.2 % of P.

【Claim 15】 The steel sheet as set forth in claim 10, wherein the steel sheet further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

【Claim 16】 The steel sheet as set forth in claim 10, wherein the steel sheet comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

【Claim 17】 The steel sheet as set forth in claim 16, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52*Al/N \leq 5$.

【Claim 18】 The steel sheet as set forth in any one of claims 10 to 17, wherein the steel sheet further comprises 0.01 ~ 0.2 % of Mo.

【Claim 19】 A bake-hardenable cold rolled steel sheet having excellent formability, comprising: 0.003 ~ 0.005 % of C; 0.003 ~ 0.025 % of S; 0.01 ~ 0.08 % of Al; 0.02 % or less of N; 0.2 % or less of P; 0.03 ~ 0.2 % of Mn; 0.005 ~ 0.2 % of Cu; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein a composition of Mn, Cu, and S satisfies the relationships: $Mn+Cu \leq 0.3$ and $2 \leq 0.5*(Mn+Cu)/S \leq 20$ in terms of weight, and wherein precipitates of MnS, CuS, and (Mn, Cu)S have an average size of 0.2 ㎛ or less.

【Claim 20】 The steel sheet as set forth in claim 19, wherein the steel sheet comprises 0.015 % or less of P.

【Claim 21】 The steel sheet as set forth in claim 19, wherein the steel sheet comprises 0.004 % or less of N.

【Claim 22】 The steel sheet as set forth in claim 19, wherein the number of precipitates is $2x10^6$ or more per unit area (mm^2).

【Claim 23】 The steel sheet as set forth in claim 19, wherein the composition of Mn, Cu and S satisfies the relationship: $2 \leq 0.5*(Mn+Cu)/S \leq 7$.

【Claim 24】 The steel sheet as set forth in claim 23, wherein the number of precipitates is $2x10^8$ or more per unit area (mm^2).

【Claim 25】 The steel sheet as set forth in claim 19, wherein the steel sheet comprises 0.03 ~ 0.2 % of P.

【Claim 26】 The steel sheet as set forth in claim 19, wherein the steel sheet further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

【Claim 27】 The steel sheet as set forth in claim 19, wherein the steel sheet comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

【Claim 28】 The steel sheet as set forth in claim 27, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52*Al/N \leq 5$.

【Claim 29】 The steel sheet as set forth in any one of claims 19 to 28, wherein the steel sheet further comprises 0.01 ~ 0.2 % of Mo.

【Claim 30】 A method of manufacturing a bake-hardenable cold rolled steel sheet having excellent formability, comprising the steps of: hot-rolling a steel slab with finish rolling at an Ar_3 transformation temperature or more to provide a hot rolled steel sheet, after reheating the steel slab to a temperature of 1,100 ℃ or more, the steel slab comprising comprising: 0.003 ~ 0.005 % of C; 0.005 ~ 0.03 % of S; 0.01 ~ 0.1 % of Al; 0.02 % or less of N; 0.2 % or less of P; 0.05 ~ 0.2 % of Mn; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein a composition of Mn and S satisfies the relationship: $0.58*Mn/S \leq 10$ in terms of weight; cooling the steel sheet at a speed of 200 ℃/min or more; winding the cooled steel sheet at a temperature of 700 ℃ or less; cold rolling the steel sheet; and continuous annealing the cold rolled steel sheet.

【Claim 31】 The method as set forth in claim 30, wherein the steel slab comprises 0.015 % or less of P.

【Claim 32】 The method as set forth in claim 30, wherein the steel slab comprises 0.004 % or less of N.

【Claim 33】 The method as set forth in claim 30, wherein the steel slab comprises 0.03 ~ 0.2 % of P.

【Claim 34】 The method as set forth in claim 30, wherein the steel slab further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

【Claim 35】 The method as set forth in claim 30, wherein the steel slab comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

【Claim 36】 The method as set forth in claim 30, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52*Al/N \leq 5$.

【Claim 37】 The steel sheet as set forth in any one of claims 30 to 36, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

【Claim 38】 A method of manufacturing a bake-hardenable cold rolled steel sheet having excellent formability, comprising the steps of: hot-rolling a steel slab with finish rolling at an Ar_3 transformation temperature or more to provide a hot rolled steel sheet, after reheating the steel slab to a temperature of 1,100 ℃ or more, the steel slab comprising: 0.003 ~ 0.005 % of C; 0.003 ~ 0.025 % of S; 0.01 ~ 0.08 % of Al; 0.02 % or less of N; 0.2 % or less of P; 0.01 ~ 0.2 % of Cu; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein a composition of Cu and S satisfies the relationship: $1 \leq 0.5*Cu/S \leq 10$ in terms of weight; cooling the steel sheet at a speed of 300 ℃/min or more; winding the cooled steel sheet at a temperature of 700 ℃ or less; cold rolling the steel sheet; and continuous annealing the cold rolled steel sheet.

【Claim 39】 The method as set forth in claim 38, wherein the steel slab comprises 0.015 % or less of P.

【Claim 40】 The method as set forth in claim 38, wherein the steel slab comprises 0.004 % or less of N.

【Claim 41】 The method as set forth in claim 38, wherein the composition of Cu and S satisfies the relationship: $1 \leq 0.5*Cu/S \leq 3$.

【Claim 42】 The method as set forth in claim 38, wherein the steel slab comprises 0.03 ~ 0.2 % of P.

【Claim 43】 The method as set forth in claim 38, wherein the steel slab further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

【Claim 44】 The method as set forth in claim 38, wherein the steel slab comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

【Claim 45】 The method as set forth in claim 38, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52*Al/N \leq 5$.

【Claim 46】 The method as set forth in any one of claims 38 to 45, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.

【Claim 47】 A method of manufacturing a bake-hardenable cold rolled steel sheet having excellent formability, comprising the steps of: hot-rolling a steel slab with finish rolling at an Ar_3 transformation temperature or more to provide a hot rolled steel sheet, after reheating the steel slab to a temperature of 1,100 ℃ or more, the steel slab comprising: 0.003 ~ 0.005 % of C; 0.003 ~ 0.025 % of S; 0.01 ~ 0.08 % of Al; 0.02 % or less of N; 0.2 % or less of P; 0.03 ~ 0.2 % of Mn; 0.005 ~ 0.2 % of Cu; and the balance of Fe and other unavoidable impurities, in terms of weight%, wherein a composition of Mn, Cu, and S satisfies the relationships: $Mn+Cu \leq 0.3$ and $2 \leq 0.5*(Mn+Cu)/S \leq 20$ in terms of weight; cooling the steel sheet at a speed of 300 ℃/min or more; winding the cooled steel sheet at a temperature of 700 ℃ or less; cold rolling the steel sheet; and continuous annealing the cold rolled steel sheet.

【Claim 48】 The method as set forth in claim 47, wherein the steel slab comprises 0.015 % or less of P.

【Claim 49】 The method as set forth in claim 47, wherein the steel slab comprises 0.004 % or less of N.

【Claim 50】 The method as set forth in claim 47, wherein the number of precipitates is $2x10^6$ or more per unit area (mm^2).

【Claim 51】 The method as set forth in claim 47, wherein the composition of Mn, Cu and S satisfies the relationship: $2 \leq 0.5*(Mn+Cu)/S \leq 7$.

【Claim 52】 The method as set forth in claim 51, wherein the number of precipitates is $2x10^8$ or more per unit area (mm^2).

【Claim 53】 The method as set forth in claim 47, wherein the steel slab comprises 0.03 ~ 0.2 % of P.

【Claim 54】 The method as set forth in claim 47, wherein the steel slab further comprises at least one of 0.1 ~ 0.8 % of Si, and 0.2 ~ 1.2 % of Cr.

【Claim 55】 The method as set forth in claim 47, wherein the steel slab comprises 0.005 ~ 0.02 % of N, and 0.03 ~ 0.06 % of P.

【Claim 56】 The method as set forth in claim 55, wherein a composition of Al and N satisfies the relationship: $1 \leq 0.52*Al/N \leq 5$.

【Claim 57】 The method as set forth in any one of claims 47 to 56, wherein the steel slab further comprises 0.01 ~ 0.2 % of Mo.